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The Relationship between Resilience Resources and Long-Term Deployment-Related PTSD Symptoms: A Longitudinal Study in Dutch Veterans

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ABSTRACT

Veterans may report PTSD symptoms, years after their deployment. The aim of this study was to examine whether the presence of resilience resources before deployment, and the potential loss of these resources over time, are associated with the risk of PTSD symptoms five years post-deployment. The study focused on Dutch service members, deployed to Afghanistan or the Gulf of Aden. Pre-deployment resilience resources (i.e. coping self-efficacy, team cohesion, and perceived organizational support) were measured in 2012–2013 ($n = 786$). Five years after deployment a follow-up study ($n = 148$) measured the same resources as well as PTSD symptoms. Hierarchical regression analysis showed that fewer resources before deployment as well as a post-deployment decline in resources predicted PTSD. Low coping self-efficacy and low perceived organizational support before deployment as well as a decline in these resources over time were significantly related to PTSD symptoms five years post-deployment. This study therefore provides initial support for a relationship between a resource loss process and PTSD symptoms in veterans five years post-deployment.

KEYWORDS

Post-traumatic stress disorder; resilience; deployment; veterans; resources; trajectories



Introduction

Military service members may be exposed to life-threatening circumstances and hostile working conditions during deployment. This puts them at risk of developing various stress-related psychological health problems after deployment, such as post-traumatic stress disorder (PTSD). PTSD is a severe disorder which negatively affects the lives of many veterans (e.g., Nichter et al., 2019; Reijnen et al., 2015; Vasterling et al., 2010, Yehuda et al., 2015). Recent research in Dutch veterans has shown that in addition to a short-term PTSD symptom increase within the first six months after deployment, there is a subgroup demonstrating symptom increase emerging at five years after deployment (Eekhout et al., 2016). Currently, there is no clear explanation why some veterans suffer from delayed onset of stress symptoms,

whereas others are able to positively adjust themselves in the long term and demonstrate resilience.

Some scholars have suggested that a decline in social resources after deployment may cause resilience to wear off, resulting in a delayed stress response (e.g., Smid et al., 2009). Being tightly connected to a military group, for example, might support a resilient response to traumatic experiences, but when this connection diminishes over time following deployment, resilience might diminish as well, contributing to a delayed increase in stress symptoms.

Our study, therefore, examines whether the presence of resilience resources before deployment, as well as the development of these resources over time, are associated with post-traumatic stress symptoms five years post-deployment in Dutch veterans who have been deployed to Afghanistan or the Gulf of Aden.

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Resilience can be seen as a process in which resources interact with demands to result in positive outcomes (Zautra et al., 2010). We expect that the presence of a diverse set of resources before and during stressful experiences will not only influence short-term outcomes but also long-term adaptation, because it hampers the emergence of resource loss cycles and facilitates the emergence of resource gain cycles. This idea stems from the widely cited Conservation of Resources Theory (COR; Hobfoll, 1989; Hobfoll et al., 2018) which describes a dynamic relationship between stress and resources. Resources are “those objects, personal characteristics, conditions, or energies that are valued by the individual or that serve as a means for attainment of these objects, personal characteristics, conditions, or energies” (Hobfoll, 1989, p. 516).

COR underlines that stress can lead to resource loss, and resource loss may also cause stress because people constantly strive to “obtain, retain, and protect that which they value” (Hobfoll, 1989, p.129). Combined, these effects can set in motion a resource loss spiral when initial resource loss cannot be compensated (Hobfoll et al., 2003) and subsequently vulnerability to ongoing or new stressful events increases. According to Hobfoll (1989), acute stress, such as life-threatening circumstances and hostile working conditions during deployment, can lead to a rapid loss of resources initiating a resource loss spiral. For example, exposure to life-threatening circumstances can lead to a loss of personal resources (e.g., sense of control or mastery). When this loss in personal resources is not compensated, this can alter an individual’s ability to work or connect with other people, which will even further erode personal resources. COR also states that compensation of resources depends on the availability of other resources (Hobfoll, 1989); those who have less resources available are more vulnerable to resource loss after acute stress. Thus, a broad reservoir of resources for resilience protects veterans from entering a resource loss cycle because it enables them to compensate resource loss in the face of deployment demands, such as coping with traumatic experiences.

Research into resilience of veterans has shown that resources within the individual (e.g., self-efficacy, optimism) and resources in the social environment (team, organization and home front) are important for short-term and long-term adaptation after deployment (e.g., Delahajj et al., 2016; Pietrzak et al., 2010; Sørensen et al., 2016). However, most studies focus on the effect of resources before or during deployment on health and well-being during and post-deployment. In these studies, the mechanism of resource loss is overlooked

as a factor while it may explain additional variance in long-term adjustment (cf. Hobfoll et al., 2003). Therefore, we propose that the mechanism of resource loss might also explain the findings of the emergence of PTSD symptoms five years post-deployment. Indeed, some studies showed resource loss after deployment. Benetsch et al. (2000) investigated the well-being of veterans of the Gulf War post-deployment and showed a decline of personal resources such as hardiness and problem-solving coping. Barnes et al. (2013) found a decline in perceived organizational support post-deployment. So, for the current study we investigated the effect of resource loss on PTSD symptoms in veterans. We focused on three resources that are deemed to play a role in long-term adjustment of service members after deployment: coping self-efficacy (Llorens et al., 2007), team cohesion (Oliver et al., 1999) and perceived organizational support (POS; Carlier et al., 1997).

Self-efficacy beliefs have been shown to boost motivation and persistence to deal with tasks and challenges leading to higher levels of self-efficacy (Llorens et al., 2007). In our study, efficacy beliefs related to coping abilities, or coping self-efficacy, are included, as studies have shown that coping self-efficacy is negatively related to post-traumatic stress after a natural disaster (Benight & Harper, 2002) and PTSD symptoms in veterans (Ginzburg et al., 2003). Mahoney and Benight (2019) showed that a potential mechanism is that lower coping self-efficacy leads to more dissociation after trauma, which may be the start of a resources loss cycle.

Team cohesion refers to the strength of internal bonds between team members. During deployments, service members need to be able to fall back on their team for emotional and instrumental support. Research has shown that cohesive teams are more supportive and buffer the negative effects of deployment demands on well-being and health (Breslau et al., 2016; Iversen et al., 2008; Jones et al., 2012; Oliver et al., 1999). Indeed, several studies have shown that team cohesion is negatively related to PTSD symptoms (Anderson et al., 2019; Dickstein et al., 2010; Han et al., 2014). As deployment is a unique military experience, we propose that the need for social bonding with former team members continues to play an important role after deployment (see e.g., Mouthaan et al., 2005). When social support declines due to changing teams and reduced cohesion among team members, this might contribute to a resource loss cycle (Anderson et al., 2019).

Perceived Organizational Support (POS) refers to service members' beliefs about the extent to which the military organization values their contribution and cares about their well-being (Eisenberger et al., 1986). POS is negatively related to stress-related symptoms and PTSD in service members (Carlier et al., 1997; Frone & Blais, 2019; Kelley et al., 2014). Kelley et al. (2014) showed that the relationship between POS and PTSD was partly mediated by stigma implying that POS is essential in providing a safe psychological environment that helps service members address symptoms early on. Barnes et al. (2013) suggest that the relationship between stress symptoms and POS is reciprocal or even driven primarily by the stress symptoms that affect perceptions of the organization. This could indicate POS being part of a resource loss mechanism over time after the experience of a traumatic event in which the loss of POS and the increase of PTSD symptoms create a vicious cycle.

To conclude, we hypothesize that the absence of resources for resilience (i.e. coping self-efficacy, team cohesion and POS) is related to post-deployment PTSD symptoms for two reasons. Firstly, resources act as protective factors as they foster a more benign appraisal of traumatic events and enhance a recovery environment (e.g. Iversen et al., 2008). As such, it prevents the initial development of PTSD symptoms. Secondly, the mechanism of resource loss explains that resources necessary to sustain an adaptive response to the trauma can erode over time. This erosion of protective factors may in turn cause a delayed onset of PTSD symptoms, or existing PTSD symptoms to remain.

Methods

Participants & procedure

As part of the standardized leadership and mental health support, the Behavioral Sciences Unit of the Netherlands Armed Forces assessed resources for resilience before deployment (T1) using the Military Resilience Monitor (Delahaj et al., 2014). In 2012–2013, 786 service members of the Netherlands Armed Forces participating in the NATO ISAF mission in Afghanistan or the NATO Anti-Piracy Mission in the Gulf of Aden filled out the questionnaire and were asked to provide their employee number so we would be able to merge their individual responses after the follow-up research. In 2018, five years after deployment (T2), service members who had provided their employee number ($n = 529$) were contacted through a letter and an email in which they were

asked to fill out an online questionnaire. In this follow-up study, post-traumatic stress symptoms were measured as well as the resources for resilience that were measured at T1. A total of 148 respondents filled out the questionnaire. Of these respondents, 114 (15% of the respondents at T1) could be matched to the data collected in 2012–2013. The 34 respondents that could not be matched to the T1 measurement had provided their employee number when participating in a second measurement of the Military Resilience Monitor during their deployment.

Ethical approval

The study was approved by the institute's Ethical Review Board. During the pre-deployment measurement participants gave permission to be contacted for a follow-up study. Written informed consent for this study was obtained from all participants before the follow-up measurement. All respondents participated voluntarily.

Measures

Post-traumatic stress symptoms at T2 were measured with the Dutch translation (Boeschoten et al., 2014a) of the PCL-5 (Weathers et al., 2013b). The PCL-5 is a self-report measure that assesses the twenty symptoms of PTSD according to the DSM-5 with one item for each symptom. Response options range from 0 ("not at all") to 4 ("extremely"). The PCL-5 has been found to be a psychometrically sound measure of PTSD symptoms in general (Blevins et al., 2015) and for veterans specifically (Bovin et al., 2016). The PCL-5 can be scored in different ways. For the purpose of our study we used the total symptom severity score (range 0–80) by summing the scores for each of the twenty items.

Resilience resources were measured at T1 and T2 with three subscales of the Military Resilience Monitor (Delahaj et al., 2014). This monitor was developed and validated for the Netherlands Armed Forces to assess a broad range of resources using short scales for each of the resources. The three subscales are based on scales available in the scientific literature, or specifically developed for the leadership and mental health support in the Netherlands Armed Forces. All items were rated on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Coping self-efficacy was measured with a three item scale based on the Brief Resilience Scale (Smith et al., 2008). An example item is "It does not take me long to recover from stressful events." Cronbach's alpha of

Table 1. Means and standard deviations for each variable and correlation coefficients.

Variable	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.	7.
1. PTSD symptoms (T2)	4.98	8.47	—						
2. Life events (T2)	144.53	102.53	.44**	—					
3. Coping self-efficacy (T1)	3.77	0.53	.07	.08	—				
4. Team cohesion (T1)	4.05	0.61	.08	.00	.21**	—			
5. Organizational support (T1)	3.36	0.84	.01	-.10	.13**	.35**	—		
6. Loss of coping self-efficacy	-0.07	0.89	.36**	.15	.68**	.08	.06	—	
7. Loss of team cohesion	0.01	0.88	.15	.04	.18	.79**	.30**	.20*	—
8. Loss of organizational support	-0.02	1.17	.27**	-.02	.02	.24*	.67**	.16	.36**

Note. *N* for correlations varies from 100–148.

* $p < .05$,

** $p < .01$.

this scale was .82 at T1 and .86 T2, indicating good reliability. Team Cohesion was measured with a four item scale specifically developed for use in the Netherlands Armed Forces (Van Boxmeer et al., 2007). An example item is “My team members will always support me in difficult situations.” Cronbach’s alpha of this scale was .88 at T1 and .88 T2, indicating good reliability. Perceived Organizational Support (POS) was measured with a two item scale specifically developed for use in the Netherlands Armed forces (Van Boxmeer et al., 2007). An example item is “The organization acknowledges the work I do.” Cronbach’s alpha of this scale was .80 at T1 and .78 T2, indicating good reliability.

To be able to investigate whether the decline in a specific resource was related to PTSD symptom severity, a new variable was created for all three resource variables that represented the amount of loss of the specific resource over time. The three resource loss variables were created by subtracting the T2 value from the T1 value for each resource variable. For our analyses, we used the T1 scores (resource present before deployment), and the T1 minus T2 scores (resource loss from before deployment to five years later) for each resource (higher scores indicating more resource loss and scores below zero indicating negative resource loss, i.e. resource gain).

Life events were measured to be able to control for the effects of other potentially traumatic events. A specifically for the Netherlands Armed Forces adapted version of the Dutch translation (Boeschoten et al., 2014b) of the Life Events Checklist for DSM-5 (LEC-5, Weathers et al., 2013a) was administered at T2. The LEC-5 is a self-report measure designed to screen for potentially traumatic events in a respondent’s lifetime known to potentially result in distress or PTSD. This adapted version of the LEC-5 assesses exposure to nineteen events and one additional item for any other extraordinarily stressful event not captured in the other items. Respondents were asked to indicate if (0 = no; 1 = yes) they had experienced any of the

events mentioned in the checklist since their return from their deployment in 2012–2013. The total score on the scale was used as a measure to control for experienced stressful life events.

Data analysis

We computed means and standard deviations for all variables and the correlations between variables. We used hierarchical regression analysis to examine the relationship between resilience resources (both before deployment as well as the development over time) and PTSD symptoms five years post-deployment. For this analysis a sample of 100 veterans was available. Because of this relatively low sample size, the significance level (alpha) was set at .05 (two-sided). All analyses were conducted using SPSS 25.0.

Results

Descriptives

Table 1 presents the descriptives (*M* and *SD*) of the variables as well as their intercorrelations (Pearson *r*). Scores for PTSD were $M = 5.1$ ($SD = 8.9$). Four participants (3.5%) would be diagnosed with PTSD based on the cutoff point of 33. Another seven participants (6.1%) reported moderate PTSD symptoms, based on scores from 16–32.

Hierarchical regression analysis

Results of the hierarchical regression analysis are presented in Table 2. A first model with Life Events as predictor variable for PTSD was significant, $F(1,98) = 18.27$, $p < .001$ and accounted for 16% of the variation in PTSD symptoms. The model with all variables included explained an additional 22% of the variation in PTSD symptoms, and the change in R^2 was significant, $F(6,92) = 5.41$, $p < .001$. Team cohesion and loss in team cohesion were not significantly related to PTSD symptoms. The loss of perceived

Table 2. Hierarchical multiple regression analysis predicting posttraumatic stress disorder symptoms from resources before deployment and loss of resources over time.

Predictor	Posttraumatic Stress Disorder Symptoms	
	Step 1	Step 2
	β	β
Life events (T2)	.40 **	.34 **
Coping self-efficacy (T1)		-.29 *
Team cohesion (T1)		.27
Organizational support (T1)		-.32 *
Loss of coping self-efficacy (T1-T2)		.39 **
Loss of team cohesion (T1-T2)		-.16
Loss of organizational support (T1-T2)		.43 **
R^2	.16	.38
F	18.27 **	7.95 **
ΔR^2		.22
ΔF		5.41 **

Note. $N = 100$;

* $p < .05$,

** $p < .001$.

organizational support was most strongly related to PTSD symptoms.

Discussion

The current study shows how resources for resilience are related to PTSD symptoms five years post deployment. Firstly, coping self-efficacy and Perceived Organizational Support (POS) before deployment appeared to be negatively related to PTSD symptoms after deployment. The effect of coping self-efficacy can be attributed to the way potential traumatic events are processed during deployment. People who believe in their ability to recover from stressful events will recover more quickly as they use more effective self-regulation strategies (Bandura, 1997). The effect of POS is in line with Carlier et al. (1997) who found that POS protects against PTSD symptoms in police officers. This effect can be attributed to the protective effect of POS on beliefs of self-worth when confronted with stressful episodes (Barnes et al., 2013).

Secondly, for coping self-efficacy and POS, loss over time was positively related to PTSD symptoms. Thus, in addition to the direct effect of pre-deployment levels of coping self-efficacy and POS, a decline of these resources was also related to more PTSD symptoms five years after deployment. This is in line with the Conservation of Resources theory (COR, Hobfoll, 1989), which states that traumatic events can trigger a resource loss cycle that can lead to more stress.

Thirdly, contrary to our expectations, pre-deployment levels of team cohesion did not buffer against PTSD symptoms post deployment. Also, the decline

of team cohesion did not relate to PTSD symptoms after five years. A potential explanation for the absence of an effect of a decline of team cohesion is that after deployment teams may have changed and team members may have left. Hence, the team composition five years after deployment is likely to be different from the team composition before deployment. As such, lower levels of team cohesion five years after deployment could also reflect the way a new team is perceived rather than being an indication of a resource loss cycle. Another potential explanation could be the regression-to-the-mean process (Barnett et al., 2005), a statistical phenomenon in which initially high or low scores are followed by scores closer to the population mean. This phenomenon is caused by nonsystematic fluctuations around the mean. In this case, higher scores on team cohesion at T1 may have been followed by lower scores on T2, causing the substantial positive correlation between T1 team cohesion and T2 loss of team cohesion. When regression-to-the-mean would be responsible for the entire loss of team cohesion, a relationship with PTSD symptoms is not to be expected, because the loss of team cohesion would be nonsystematic. Although for the other two resources (coping self-efficacy and organizational support) the high positive correlation between the T1 measures and the degree of loss at T2 indicates a regression-to-the-mean process too, the relationship with PTSD symptoms for both T1 and T2 (loss) measures indicates that there is systematic change in these resources as well. For team cohesion this relationship was not found. With regard to the effects of pre-deployment team cohesion, two other studies also failed to find support for a buffering effect on PTSD symptoms (Han et al., 2014; Polusny et al., 2011). In these studies, no specific explanations were given for these results. The study by Han et al. (2014) also showed that team cohesion during deployment did have an effect on post-deployment PTSD symptoms, and that this effect disappeared when post-deployment social support was included in the analyses. In other words, the buffering effects of team cohesion may be more immediate and become less relevant for more distant outcomes.

Interestingly the decline in coping-self efficacy and team cohesion was related, as well as the loss of team cohesion and the loss of POS. This indicates that resource loss in the individual domain coincides with resource loss in the team domain and loss in the team domain coincides with loss in POS. Although this study does not provide insights in the way these relationships unfold, COR theory suggests that a loss

cycle can start with the loss of beliefs in self-worth consequently triggering disengagement from the team and the organization (Hobfoll, 1989).

Limitations

The present study has some limitations. Firstly, for only 15% of the respondents at T1, we had a matching record at T2. Overall, these respondents scored relatively low on PTSD symptoms; 3.5% of the participants had symptoms that might indicate possible PTSD five years after deployment. Previous research in a comparable population found that about 13% scored above the cutoff for a PTSD diagnosis, five years after deployment (Eekhout et al., 2016). However, both studies differed in the instrument they used in assessing PTSD symptoms. Moreover, the latter study assessed PTSD in veterans that participated in a highly demanding deployment which applied to a lesser extent for the participants in our study. Nevertheless, our lower rate of veterans with PTSD might indicate that in our sample self-selection took place, resulting in a lowered participation of service members experiencing PTSD symptoms. Future research is necessary to determine whether the results generalize to veteran populations with higher PTSD rates.

In addition, we did not collect data about PTSD symptoms in this population immediately after their deployment. Therefore, we were not able to determine whether and how PTSD symptoms changed over time. Hence, the results may not only pertain to delayed onset PTSD (cf. Eekhout et al., 2016), because the onset may have taken place at any time before, during or after deployment. Nevertheless, we did find support for a decline in resources predicting PTSD symptoms five years post deployment. This finding strengthens our idea that resource loss may lead to an aggravation or a later onset of PTSD symptoms. Future studies should ideally conduct assessments at multiple time points after deployment to obtain a better view of the resource loss process, the delayed PTSD onset process, and the relationship between these two processes. Moreover, such a design may also provide more insight in how initial resource losses may lead to subsequent resource losses. Knowledge could be gained about how individual resource loss may lead to loss of social (e.g., team/organizational) resources, and the other way around.

Finally, we did not collect data about the duration and the nature of the deployments, the exposure to trauma during deployments, or the presence of other

sources of support during or after deployment. All these factors could potentially influence PTSD symptoms. Including these factors in future research would likely lead to a higher proportion of explained variance in PTSD symptoms.

Our research extends previous research, by drawing attention to the role that resources play in the level of PTSD symptoms in the longer term. The results show that having resilience resources before deployment, as well as being able to maintain these resources over time, are essential for long-term post-deployment adjustment. We believe that our study underlines the importance of monitoring veterans' resources and their health and well-being for a prolonged period of time after exposure to initial trauma. If replicated with more rigorous methodologies, this line of research might create awareness of the risks of resource loss after deployment, and inform the development of interventions aimed at countering the erosion of resources after deployment. This may contribute to long-term positive post-deployment adjustment of war exposed veterans.

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